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## Unmanned Aircraft Systems (UAS) Training

Report on the Let's FLY and Let's MAP training in Addis Ababa, Ethiopia



# Contents

<b>Introduction</b> .....	<b>1</b>
<b>Training Overview</b> .....	<b>3</b>
<b>Training Details</b> .....	<b>4</b>
<b>Survey Results</b> .....	<b>5</b>
<b>Conclusion</b> .....	<b>7</b>
<b>Annex</b> .....	<b>8</b>
<b>Acronyms</b> .....	<b>9</b>

# Introduction

In May 2019, World Food Programme (WFP), as lead of the Emergency Telecommunications Cluster (ETC), conducted Unmanned Aircraft Systems (UAS) training in Addis Ababa. Let's FLY and Let's MAP are the second and third of three teaching modules and followed the Let's COORDINATE training held in April 2019. These two-day training sessions gathered national stakeholders to undertake practical flight exercises and process data captured by drones, to build capacity and further the integration of drone technology into humanitarian operations in Ethiopia.

This capacity building opportunity was a joint initiative between WFP's Aviation (including United Nations Humanitarian Air Service [UNHAS]) and Programme (Climate Change Solution) teams in the Ethiopia country office, conducted with support and personnel from the Technology Division and funding from the Government of Belgium.

32 participants from 10 organizations attended the second and third training modules. Let's FLY demonstrated different types of drones used in humanitarian contexts and outlined the policies, regulations and safety aspects of flying a drone. Participants logged 12 hours of flight time over 2 days, complementing the introductory flight demonstration that took place during Let's COORDINATE. Let's MAP gave participants an overview of the application of drones for 2D mapping and 3D models for uses such as emergency preparedness and disaster response and covered critical aspects of data protection. These trainings aimed to equip participants with the skills and knowledge to apply drone technology to local uses relevant to Ethiopia, such as crop management and refugee settlement mapping.

This report outlines key figures and achievements.

**This training was organized and supported by:**



**Belgium**  
partner in development





# Training Overview

Between 14 and 17 May 2019, WFP, supported by the Government of Belgium and local organizations, conducted the Let's FLY and Let's MAP trainings in Addis Ababa, Ethiopia. National entities, intergovernmental organizations and humanitarian agencies attended this four-day event.

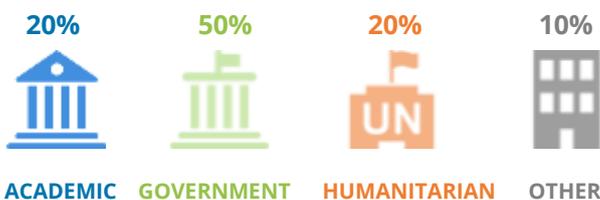


**10 ORGANISATIONS**  
**32 PARTICIPANTS**  
**87.5% MEN VS. 12.5% WOMEN**

## Participating organizations:

- Abyssinian Flight Services (AFS);
- Ethiopian Civil Aviation Authorities (ECAA);
- Geospatial Information Institute (GI<sup>2</sup>);
- Information Network Security Agency (INSA);
- Ministry of Agriculture (MoA);
- National Disaster Risk Management Commission (NDRMC);
- National Institute for Control and Eradication of Tsetse Fly and Trypanosomosis (NICETT);
- Somali Regional State Agricultural & National Resource Development Bureau (BOANRD);
- United Nations High Commissioner for Refugees (UNHCR);
- WFP (including Aviation, Programme).

## Breakdown of organizations:



## The full UAS training consists of three modules:

### LET'S COORDINATE



### LET'S FLY



### LET'S MAP



During the four days training, participants received 12 flight hours using multi-rotor systems and took part in discussions on the safety measures required before and during drone flight, including the safety of communities. Participants also received training on mapping for the creation of 2D maps and 3D models. The training was complemented by detailed analysis of identifying the most appropriate type of drone to use and how to capture high resolution imagery during drone flight. Debate took place around data privacy and practical applications in other countries and regions, especially in climate change scenarios.

## Let's FLY



**12 FLIGHT HOURS**

Technology used for practical sessions:



**SPARK  
MAVIC PRO**

## Let's MAP

Participants learnt to process drone images into 2D maps and 3D models for assessments, using the following software:

- Pix4D / Pix4D Cloud;
- Agisoft PhotoScan;
- Open Drone Map (ODM).

# Training Details



*Learning how to generate information from the drone images is great for us because this is what we need to map the 27 refugee camps currently in Ethiopia. Drone mapping can be used to plan settlement expansion by looking for suitable land. Therefore, data analysis is the important part for me.*

**Yewubdar Mekasha, UNHCR Shelter Officer**

## Learning to fly with precision

The aim of the Let's FLY training was to equip participating agencies with the knowledge and skills to safely and efficiently operate various types of UAS in humanitarian and disaster management operations.

The participants were given safety checklists to run through each time they took control of a drone. They were divided into groups of 8 to ensure each participant was given 12 hours of flight time over 2 days using 2 different types of multi-rotor systems. Maximizing flight time allowed participants to build confidence in handling drones alongside flight skills.

The flight training included an advanced obstacle course that required careful navigation skills, a 2-person communications task and the creation of a flight path during which participants captured imagery on an SD card for use in Let's MAP.

## Mapping for humanitarian assistance

Let's MAP aimed to teach participants how to apply drone technology to create 2D maps and 3D models through practical data processing exercises.

The facilitators delivered theoretical sessions on drone applications such as different types of cameras and their uses and also detailed sessions on mapping software—Pix4D mapper and Agisoft, Photoscan—including practical exercises for participants. Using the imagery captured on SD cards from the Let's FLY sessions, participants were able to directly apply their own footage to create high resolution aerial maps.

Participants also received a refresher on UAS imagery use-cases during disasters such as rapid response for damage assessment and landslide risk reduction.

Let's MAP closed the training series, giving the participants a full insight into drone operations.

*As GIS experts, we plan to use drone technology for data capturing for early warning application and assessment. Currently, the technology we have uses very low resolution satellite imagery and this technology will enable us to transform our work and deliver best information to decision makers.*

**Abiy Wogderes Zinna, WFP**



# Survey results



*We are preparing to use drone technology to collect and map data for land planning and management. The ability to fly drones will have so many uses for our department, for example, we will map potential flood areas, process the data and give this to decision makers to mitigate disaster and ultimately save lives.*

**Degu Tadesse, Geospatial Information Institute (GI<sup>2</sup>)**

- The training met the expectations of 96% of participants.
- 90% of participants were satisfied with the two modules in terms of the content and number of activities in the time available.
- 97% of participants found that there was a good variety of content delivery methods.
- From an organizational perspective, the biggest learnings were: practical application of drone technology for e.g. agricultural and land mapping and the distribution of tsetse flies; working with high resolution imagery; reinforcement of existing uses of drone flight and mapping.
- The participants particularly enjoyed: learning how to apply different mapping software and the practical drone flight experience, particularly the obstacle course. Notably, almost all participants expressed enthusiasm for the teaching methods and delivery of the Let's FLY and Let's MAP training sessions.
- Among the biggest personal learning, the participants named: how drone technology can be applied to the humanitarian sector; direct and practical experience of flying and operating drones; the development of flight plans; stringent health and safety checks before flying drone; confidence in applying mapping software to data captured by drones.
- The participants suggested the following improvements: increase the duration of Let's MAP by 1 day to provide more exhaustive training; provide the mapping applications for download in advance of the Let's MAP session; deliver instructions at a slower pace.

*This is the first time in the history of Ethiopia that civilians have been trained to fly drones for the purposes of disaster mitigation and climate change. The potential in the East African region to use drone technology for humanitarian work, development and transportation is huge, especially in a country such as Ethiopia which covers a large geographical area with hard-to-reach places.*

**Pierre Lucas, UNHAS, Ethiopia Country Office**





# Conclusion

Various divisions of WFP, from the Country Office in Ethiopia (Aviation and Programme) as well as Headquarters in Italy (TECHnology Division), have come together to deliver the final two parts of the three-module UAS training in Addis Ababa in May 2019. This learning experience was possible thanks to support from the Government of Belgium, as well involvement of all participating organizations due to their active engagement.

Having undertaken the full induction to drones operations – Let’s COORDINATE, Let’s FLY and Let’s MAP – these key organizations working across government and humanitarian assistance will apply new skills and knowledge of drone technology to their projects and operations, enabling them to become more cost-efficient and to reach wider areas. Ultimately, this will assist in reaching more affected populations more effectively. The impact has already been seen in countries across Africa, particularly in Mozambique where pilots trained by WFP in 2018 were able to respond to Cyclone Idai that struck in early March 2019.

Emphasising the potential impact of drone technology on development solutions in Ethiopia, Climate Solutions Team Leader at the WFP Country Office, Rupak Manvatkar stated:

*These drones can collect information about topography, about soils, about the greenness of vegetation and that information can be used for development purposes, such as understanding the impact of drought. Such information can be used by the Ethiopian government to plan activities accordingly.*

Spanning a wide range of implementation uses – from disaster risk management, to emergency response to development solutions – the applications for drone technology in Ethiopia are promising.

Please note that WFP UAS training does not replace national regulation and a professional pilot license might be required to operate drones in your country of residence / assignment.



# Annex

## Training Agenda

SESSION	TIME	FACILITATOR(S)
<b>Tuesday, 14 May (Let's FLY)</b>		
Opening & Introduction	0.5 h	WFP Ethiopia, WFP UAS Team
Introduction to Unmanned Aircraft Systems (UAS)	1 h	WFP UAS Team, Help.NGO
Hands on flight	1.5h	Help.NGO
Flight planning and regulations	1 h	Help.NGO
Hands on advanced flight	1.5h	WFP UAS Team, Help.NGO
<b>Wednesday, 15 May (Let's FLY)</b>		
Day1 recap	0.5 h	WFP UAS Team
Introduction to advanced UAS	1 h	WFP UAS Team, Help.NGO
Hands on mapping flight	1.5h	Help.NGO
Hands on flight advanced	1 h	Help.NGO
Post process/checking data	1 h	WFP UAS Team, Help.NGO
Hands on advanced mapping / Field flight exercise to capture	1.5 h	Help.NGO
Post process/checking data	1 h	WFP UAS Team, Help.NGO
<b>Thursday, 16 May (Let's MAP)</b>		
Introduction	0.5 h	WFP UAS Team
Introduction to UAS imagery and GIS mapping	1 h	WFP UAS Team, Help.NGO
Overview on data privacy laws	1.5 h	Help.NGO
Best practices for data privacy	1 h	Help.NGO
Data standards for image processing	2 h	Help.NGO
<b>Friday, 17 May (Let's MAP)</b>		
Day 1 recap	0.5 h	WFP UAS Team, Help.NGO
Mapping platform overview (software)	1 h	Help.NGO
Hands on with program	1 h	Help.NGO
Hands on mapping	1 h	Help.NGO
Post process/checking data	1 h	Help.NGO
Hands on advanced mapping	1 h	Help.NGO
Post process/checking data	0.5	Help.NGO
Certificates	0.5	WFP UAS Team, Help.NGO, WFP

# Acronyms

<b>AFS</b>	Abyssinian Flight Service
<b>CAA</b>	Civil Aviation Authority
<b>ECAA</b>	Ethiopian Civil Aviation Authorities
<b>ETC</b>	Emergency Telecommunications Cluster
<b>GI2</b>	Geospatial Information Institute
<b>INSA</b>	Information Network Security Agency
<b>MoA</b>	Ministry of Agriculture
<b>NDRMC</b>	National Disaster Risk Management Commission
<b>NGO</b>	Non-Governmental Organization
<b>NICETT</b>	National Institute for Control and Eradication of Tsetse Fly and Trypanosomosis
<b>UAS</b>	Unmanned Aircraft Systems
<b>UNHAS</b>	United Nations Humanitarian Air Service
<b>WFP</b>	World Food Programme

## Photo Credit

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